OIPE JC50 NOV 1 2 2004 PATENT & TRADEMARK OFFICE (stamp)

FEE TRANSMITTAL
for FY 2005

Effective 10/01/2004. Patent fees are subject to annual revision.

Complete if Known	
Application Number	10/632,467
Filing Date	August 1, 2003
First Named Inventor	Watanabe, Haruaki
Examiner Name	Unassigned
Art Unit	2186
Attorney Docket No.	16869K-088500US

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($) 130.00

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ Other ☐ None
☒ Deposit Account:

Deposit Account Number: **20-1430**

Deposit Account Name: **Townsend and Townsend and Crew LLP**

The Director is authorized to: *(check all that apply)*
☒ Charge fee(s) indicated below ☒ Credit any overpayments
☒ Charge any additional fee(s) or any underpayment of fee(s)
☐ Charge fee(s) indicated below, **except for the filing fee**
to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Fee ($)	Small Entity Fee Code	Fee ($)	Fee Description	Fee Paid
1001	790	2001	395	Utility filing fee	
1002	350	2002	175	Design filing fee	
1003	550	2003	275	Plant filing fee	
1004	790	2004	395	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)0.00

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Extra Claims		Fee from below		Fee Paid
Total Claims		-** =		X	
Independent Claims		-** =		X	
Multiple Dependent				X	

Large Entity Fee Code	Fee ($)	Small Entity Fee Code	Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	88	2201	44	Independent claims in excess of 3
1203	300	2203	150	Multiple dependent claim, if not paid
1204	88	2204	44	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($)0.00

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Fee ($)	Small Entity Fee Code	Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for ex parte reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	430	2252	215	Extension for reply within second month	
1253	980	2253	490	Extension for reply within third month	
1254	1,530	2254	765	Extension for reply within fourth month	
1255	2,080	2255	1,040	Extension for reply within fifth month	
1401	340	2401	170	Notice of Appeal	
1402	340	2402	170	Filing a brief in support of an appeal	
1403	300	2403	150	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive – unavoidable	
1453	1,330	2453	665	Petition to revive – unintentional	
1501	1,370	2501	685	Utility issue fee (or reissue)	
1502	490	2502	245	Design issue fee	
1503	660	2503	330	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	130
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	790	2809	395	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	790	2801	395	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify)_____

*Reduced by Basic Filing Fee Paid   SUBTOTAL (3)   ($)130.00

SUBMITTED BY

Name (Print/Type)	Chun-Pok Leung	Registration No. (Attorney/Agent)	41,405	Telephone	650-326-2400
Signature	*(signature)* CL/04			Date	November 12, 2004

Complete *(if applicable)*

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60355004 v1

Attorney Docket No.: 16869K-088500US
Client Ref. No.: 626/SM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

    Haruaki WATANABE *et al.*

Application No.: 10/632,467

Filed: August 1, 2003

For: METHOD OF MANAGING
       GENERATION OF BACKUP
       DATA AND STORAGE
       CONTROL DEVICE USED
       THEREFOR

Customer No.: 20350

Examiner: Unassigned

Technology Center/Art Unit: 2186

Confirmation No.: 3818

**PETITION TO MAKE SPECIAL FOR
NEW APPLICATION UNDER M.P.E.P.
§ 708.02, VIII & 37 C.F.R. § 1.102(d)**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

       This is a petition to make special the above-identified application under MPEP § 708.02, VIII & 37 C.F.R. § 1.102(d). The application has not received any examination by an Examiner.

       (a)   The Commissioner is authorized to charge the petition fee of $130 under 37 C.F.R. § 1.17(i) and any other fees associated with this paper to Deposit Account 20-1430.

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(b)   All the claims are believed to be directed to a single invention. If the Office determines that all the claims presented are not obviously directed to a single invention, then Applicants will make an election without traverse as a prerequisite to the grant of special status.

(c)   Pre-examination searches were made of U.S. issued patents, including a classification search and a computer database search. The searches were performed on or around July 14, 2004, and were conducted by a professional search firm, Kramer & Amado, P.C. The classification search covered Class 707 (subclasses 100 {U.S. and Foreign} and 204 {U.S. and Foreign}), Class 711 (subclass 162 {U.S. and Foreign}), and Class 714 (subclasses 5 {U.S. and Foreign}, 6 {U.S. and Foreign}, and 13 {U.S. and Foreign}). The computer database search was conducted on the USPTO systems EAST. The inventors further provided references considered most closely related to the subject matter of the present application (see references #5-11 below), which were cited in the Information Disclosure Statement filed with the application on August 1, 2003.

(d)   The following references, copies of which are attached herewith, are deemed most closely related to the subject matter encompassed by the claims:

(1)   U.S. Patent No. 6,718,352 B1;

(2)   U.S. Patent Publication No. 2003/0126388 A1;

(3)   U.S. Patent Publication No. 2003/0182329 A1;

(4)   U.S. Patent Publication No. 2004/0010732 A1;

(5)   Japanese Patent Publication No. 09-265419;

(6)   Japanese Patent Publication No. 04-305742;

(7)   Japanese Patent Publication No. 11-134234;

(8)   Japanese Patent Publication No. 2000-089917;

(9)   Japanese Patent Publication No. 2001-051806;

(10)   Japanese Patent Publication No. 2001-159993; and

(11)   Japanese Patent Publication No. 2002-099418.

(e)   Set forth below is a detailed discussion of references which points out with particularity how the claimed subject matter is distinguishable over the references.

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A.   Claimed Embodiments of the Present Invention

The claimed embodiments relate to a method for performing with a storage control device generation management of backup data that is produced in a plurality of pairs originating from one volume, with high efficiency and better operability, as well as to a storage control device.

Independent claim 1 recites a method of managing a generation of backup data in a storage system carried out by a storage control device, where the backup data is generated in each of a plurality of pairs originating from one volume. The method comprises receiving, from a host computer, a split request for stopping synchronization between a primary volume and a secondary volume in one of the pairs, and version information about a split process corresponding to the split request; performing the split process in which a backup between the primary volume and the secondary volume of the pair is performed in response to the split request and the synchronization of the pair is stopped; and storing, for each pair, the version information of the split process in a predetermined storage section.

Independent claim 6 recites a storage control device used for managing a generation of backup data, where the backup data is generated in each of a plurality of pairs originating from one volume. The storage control device comprises a processor configured to read/write data from/to a primary volume and a secondary volume in each pair in response to a request from a host computer that is connected to the storage control device. A receiving section is configured to receive, from the host computer, a split request for stopping synchronization between a primary volume and a secondary volume in one of the pairs, and version information about a split process corresponding to the split request. A control section is configured to perform a split process in which a backup between the primary volume and the secondary volume of the pair is performed in response to the split request and the synchronization of the pair is stopped. The processor is configured to store, for each pair, version information of the split process in a predetermined storage section.

Independent claim 11 recites a storage control device used for managing a generation of backup data, wherein the backup data is generated in each of a plurality of pairs originating from one volume. The storage control device comprises processing means for reading/writing data from/to a primary volume and a secondary volume in each the pair in response to a request from a host computer that is connected to the storage control device;

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receiving means for receiving, from the host computer, a split request for stopping synchronization between a primary volume and a secondary volume in one of the pairs, and version information about a split process corresponding to the split request; and control means for performing the split process in which a backup between the primary volume and the secondary volume of the pair is performed in response to the split request and the synchronization of the pair is stopped. The processing means stores, for each the pair, the version information of the split process in a predetermined storage section.

One of the benefits that may be derived is that the version information of backups is managed reliably, and restore processes based on the secondary volume for the designated version can be carried out easily, quickly, and efficiently in response to restore requests from a host computer. Moreover, the generation management is performed entirely by the storage control device without spending the host computer's resources, so that not only the management costs are reduced and management efficiency is improved, but accesses from external sources can be suppressed as appropriate, thereby increasing security. In addition, by using the time given by the host computer, it is possible to eliminate conflicts in the chronological order between the host computer and the storage control device, and the backup data can be managed and handled in their correct chronological order.

B. Discussion of the References

None of the following references disclose or suggest performing the split process in which a backup between the primary volume and the secondary volume of the pair is performed in response to the split request and the synchronization of the pair is stopped; and storing, for each pair, the version information of the split process in a predetermined storage section.

1. U.S. Patent No. 6,718,352 B1

This reference discloses a method and apparatus for managing a remote mirror or synchronous copy of a data set stored on a data storage device, while retaining the original version of the data set resident on the host computer. The data manager 56 of the host computer 24 makes changes to the data set M1 based on any data changes stored in memory 48 while copying the data set M1 to the synchronous copy of the data set M2. The data manager 56 also establishes the synchronous relationship 28 between the data set M1 and the

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synchronous copy M2, meaning that the data manager 56 transmits any changes make to the data set M1 to the data storage assembly 22 to update the synchronous copy M2 so that the data in the synchronous copy M2 is updated to the same state as the data in the data set M1. See column 7, line 66 to column 8, line 32.

2.   U.S. Patent Publication No. 2003/0126388 A1

This reference discloses a technique for remote storage replication. Multiple remote copies of information can be made without the necessity of copying information for each pair. One or more remote mirror pairs can be created for disaster recovery, testing, or other purposes. In step 1110b, if there is a remote mirror or an indirect mirror, the storage system 100a checks if the remote mirror is using synchronous mode operation or asynchronous mode operation. In synchronous remote copy operation, when a host 110a writes data on a volume 105a, the storage system 100a first copies the write data to the secondary storage system 100b, and then notifies the host 110a of write command completion. The pending data is copied to the secondary storage system 100b while the storage system 100a is idle. See paragraphs [0008] and [0072].

3.   U.S. Patent Publication No. 2003/0182329 A1

This reference discloses a file backup technique for backing up files which are accessed and updated by a plurality of clients in a device, enabling a plurality of clients to access files and storage regions via a network such as NAS or a file server. The file to be backed up 110a is synchronized with the replica files 112 set by the backup configuration managing function 121. The fixed revision file processing function 120 monitors the synchronized state of the file to be backed up 110a and the replica files 112 set by the backup configuration managing function 121, and monitors which replica file is completely synchronized and has the same contents as the file to be backed up, and which replica file has just started synchronization and is still being synchronized. When creation of the fixed revision files is completed, the replica files which were used are returned to the synchronization process with the file to be backed up 110a, and is to be monitored of the synchronization state. See paragraphs [0034]-[0037].

4.   U.S. Patent Publication No. 2004/0010732 A1

This reference relates to a backup method and storage control device that instructs a storage device to split a primary volume and copy volume in the storage device, and to execute a backup operation from the copy volume to a backup volume. Storage control device 101 uses MRCF control function 104 of RAID disk device 103 to generate a pair from primary volume 111 and copy volume 112 in a state that can be used independently. Storage control device 101 uses backup/restore processing module 115 to copy the files stored in copy volume 112 to be backed up to disk cache 132 (S603). The storage control device 101 uses generation/backup/restore target management module 117 to update backup volume 133 so that the contents of copy volume 112 from the oldest generation (first generation) to the most recent generation (nth generation) are updated to indicate one prior generation (S608). Upon completion of the backup operation, the MRCF control function 104 of the RAID disk device 103 re-links the split primary volume and the copy volume pair to enable duplex status. See paragraphs [0050]-[0052] and [0055].

5.   Japanese Patent Publication No. 09-265419

This reference relates to a method of removing the overlapped storage of records common to respective generations and making it unnecessary to switch files among respective generations. A generation integration file 10 allows a data substance and date information to be attribute information for the data substance to correspond to each retrieval key item. In the case of preparing a succeeding generation, the file 10 is copied and the data substance of a specific record is corrected. Only the corrected record is extracted, a new date information is added to the record and the record is additionally registered in the file 10. In the case of deleting a certain record, a deletion flag is used. When a retrieval date is specified, the retrieval date is set up as a maximum value and a record most close to the date is specified in each retrieval key item, so that the record group of a required generation can be retrieved.

6.   Japanese Patent Publication No. 04-305742

This reference relates to a version management processing system that executes batch processing without interrupting on-line processing and rapidly executes the

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on-line processing by registering the unupdated contents of an updating part together with updating time. When block updating is requested by the on-line processing of a user program 101, a version management part 102 requests a block corresponding to a block discriminator applied from the program 101 to a data access control part 105 and reads out the block from a data base storing area 106. Then the unupdated contents of an updating part are extracted from the read block. The extracted unupdated contents and current time information requested and acquired from an updating time managing part 104 are registered in an updating item registering area 103 as a pair of updated information and the updated block is rewritten in the area 106 by the control part 105. Thereby the batch processing can overwrite the updated information on the block contents of the area 106 and the batch processing and the on-line processing can refer to the up-to-date block contents.

7.   Japanese Patent Publication No. 11-134234

This reference relates to a backup list method of easily restoring an original file in the state of time back to prescribed time from present time. Processes (S801-S803) for designating the file of a restoration object and time from present time to past time so that the file can be restored to the state of past time to arbitrary time from present time and for designating the execution of the restoration process and a process (S804) for selecting the pertinent backup copy based on the file designated as the restoration object and designated time and controlling the execution of the restoration process are contained.

8.   Japanese Patent Publication No. 2000-089917

This reference relates to an information processor that directly backs up or restores data from a magnetic storage device in a storage device sub-system without imposing a burden to a master device. Relating the information processor including the storage device sub-system consisting of a main side RAID magnetic storage device 3 connected to the master device 1 and a sub-side RAID magnetic storage device 4 arranged on a remote place and a backup device 7 connected to the device 4 and consisting of a backup controller 8 and an automatic library device 21 following the controller 8, the controller 8 is provided with an automatic library device control part 20 for controlling the device 21 and a backup control part 15 having a control function for backing up/restoring the data of a main volume 31

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stored in the device 3 to a portable recording medium 2b stored in the device 21 through a sub-volume 32 in the device 4.

9.   Japanese Patent Publication No. 2001-051806

This reference relates to a method of improving the overhead and read performance of a disk array RAID (Redundant Array of Inexpensive Disks) at write time and efficiently performing the generation management of files. The device is equipped with a parity process part 19 which finds parity data by exclusively ORing data of a write request from a host, 1st and 2nd batch write buffers 21 and 22 which temporarily hold the data of the write request from the host and have double buffer constitution, a parity buffer which holds the parity data until all the data constituting stripes are written to the batch write buffers, an address conversion table which holds the correspondence between logical addresses and physical addresses, and a logical address sorting part 18 which sorts the data in the batch write data by using logical keys as keys.

10.   Japanese Patent Publication No. 2001-159993

This reference relates to a method of solving the problem such that a database state at an optional time is not traced back and referred at the optional time and also a back-up generation time is required to be cleanly indicated by a user in a conventional method for generating a back-up database to manage a generation, which is provided for referring to not only a present database state but also a past database state. A data storage device is provided with a mechanism for preserving pre-updating information in a reference possible form concerning database updating and for managing the pre-updating information with preserved pre-updating information and updating time information as keys. Then the pre-updating information is specified by optional time designation and a past database state is restored and referred.

11.   Japanese Patent Publication No. 2002-099418

This reference relates to a version up method of attaining a prevention of version up in progress at a client side without completing version up to the latest version at a sitting in spite of existence of version up data of more than one generation in a server. In a client/server system, the version up data of software to be installed by a client is registered

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into the server going into two or more versions, and the version up data is managed with connecting in order of version. A client performs version up successively for the version up data from the version of the software owned by the client up to a desired version of the generation in progress referred to the version up data registered into the server.

(f)   In view of this petition, the Examiner is respectfully requested to issue a first Office Action at an early date.

Respectfully submitted,

Chun-Pok Leung
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Attachments
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